

REMARKS

Applicant respectfully requests reconsideration of this application in view of the foregoing amendment and following remarks.

Status of the Claims

Claims 1, 7, 9, 10, 33, 35 and 67 are pending in this application, of which claims 1, 9 and 10 are independent. Claims 2-6, 11-16, 26, 32 and 36-39 are withdrawn from consideration. All of the pending claims stand rejected. By this amendment, claims 1, 9 and 10 are amended. Claims 2-7, 11-16, 26, 32, 33, 35-39 and 67 are canceled without prejudice or disclaimer. New claims 68-82 are added. No new matter has been introduced by this amendment.

Rejections under 35 U.S.C. §§102 and 103

Claims 1, 7, 9, 10, 33 and 67 have been rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent No. 6,064,504 to Minakuchi et al. ("Minakuchi"). Claim 35 has been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Minakuchi.

Claims 7, 33, 35 and 67 have been canceled thereby rendering the rejections directed to these claims moot.

Independent claims 1, 9 and 10 have been amended for further clarification. Each of amended claims 1, 9 and 10 is directed to a two-dimensional scanning apparatus scanning an image spot on a surface to be scanned comprising, *inter alia*, "a deflector for two-dimensionally deflecting a light beam from a light source into a horizontal direction and a vertical direction, the light beam deflected from said deflector defines a maximum view angle having a central axis of a two-dimensional deflection range of the light beam as a deflection scanning axis."

In particular, amended claim 1 further recites, *inter alia*, an optical system including (1) an optical element a surface vertex of which is tilted and/or shifted from the deflection scanning

axis and (2) no reflecting surface optical power. Amended claim 9 further recites, *inter alia*, the optical surface of the optical element is tilted from the deflection scanning axis at an angle larger than the maximum angle of view of the light beam deflected by the deflector. Amended claim 10 further recites, *inter alia*, that the surface to be scanned is tilted from the central axis of the two-dimensional deflection range of the deflected light beam.

Referring to Figs. 1 and 2 as shown below, the two-dimensional scanning apparatus includes a deflector 4 that deflects the light beam from the light source 1 into the surface to be scanned 6 in a horizontal direction and a vertical direction. Specifically, as shown in Fig. 2, the deflector 4 comprises a first deflecting unit 4a and a second deflecting unit 4b each configured to scan (i.e., deflect) the light beam into the horizontal and vertical directions, respectively. See, also, paragraph [0097] of corresponding published application (i.e., U.S. Pub. No. 2004/0080799 A1).

FIG. 1

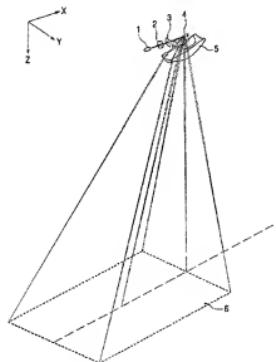
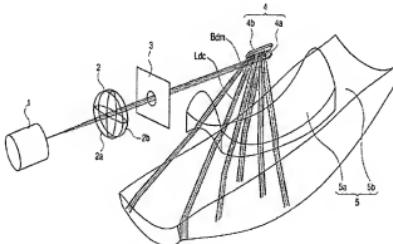


FIG. 2



Referring to Figs. 12 and 13 of the present application as shown below, amended claim 1 further requires, *inter alia*, that the surface vertex A_{se} of the optical element (e.g., 5b) of the optical

system 5 is tilted and/or shifted from the deflection scanning axis L_{dc} . Amended claim 9 further requires, *inter alia*, that the tilting angle β of the tilted optical element (e.g., 5b) is larger than the maximum angle of view 2α of the deflected light beam. Amended claim 10 further requires, *inter alia*, that the surface to be scanned 6 is tilted relative to the central axis (i.e., the deflection scanning axis) of the two-dimensional deflection range of the light beam deflected by the deflector.

FIG. 12

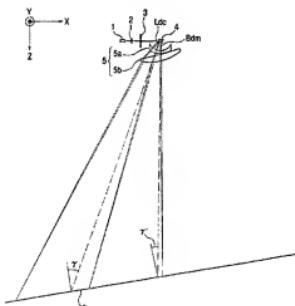
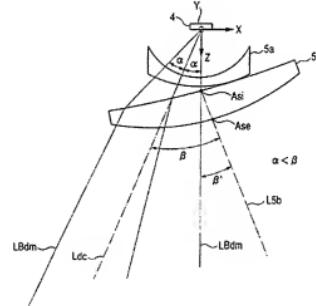


FIG. 13



In *Response to Arguments* section, the Final Office Action indicates, *inter alia*, that Minakuchi teaches a two-dimensional scanning apparatus and describes that "Minakuchi in each of his drawings even discloses a two-dimensional axis showing the direction of the scan." The Final Office Action also indicates that Minakuchi teaches an angle of optical surface larger than the maximum field angle and describes "Minakuchi discloses this in his written disclosure states that a mirror is placed outside of an edge of the main scanning range, but outside of a predetermined image forming range (not shown). The mirror is positioned in the optical path from the surface to the fold mirror meaning the optical system lens is tilted at an angle outside of

the maximum view in order to contact the mirror." The Final Office Action goes assert that Minakuchi teaches that the optical surface is tilted in the same direction and refers to Fig. 6 of Minakuchi. [Page 7 of the 07-03-2008 Final Office Action]

As Applicant understand it, however, Minakuchi teaches nothing of the above indicated features. First of all, referring to Figs. 2 and 6 of Minakuchi as shown below, the scanning optical device 100 includes a polygonal mirror 180 as a deflector and fθ lens 190 as scanning lens. A relevant portion of Minakuchi describes that "[i]n operation, eight light beams are emitted from the light transmission device 100, deflected (scanned) by the polygonal mirror 180, pass through the fθ lens 190, to form eight scanning lines on a photoconductive surface, such as a photoconductive drum 210." [col. 2, lines 62-67]

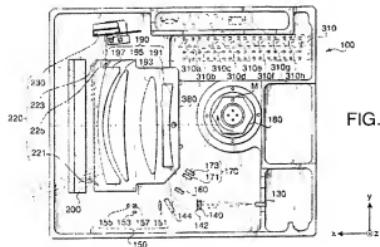


FIG. 2

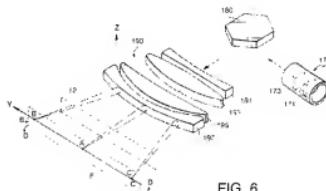


FIG. 6

As is well known in the art, the polygonal mirror 180 as a deflector does not deflect (scan) the light beam into a two-dimensionally as required by the present invention. For example, as described above, the deflected light merely forms eight scanning lines stretched along the Y axis which is one-dimensional. The direction arrow Y as shown in Fig. 6, for example, merely shows the direction of the formed line, i.e., the direction arrows do not necessarily indicate that the scanning optical device is a two-dimensional.

Secondly, as apparent from Figs. 2 and 6 above, the deflection scanning axis (indicated as a central dotted line in Fig. 2) coincident with the optical axis of the scanning lens 190, i.e., no scanning lenses 190 is tilted from the deflection scanning axis as specifically required by claims 1, 9 and 10 as amended. As a result, Minakuchi automatically fails to teach that the tilting angle of the optical element (i.e., scanning lens) is larger than the maximum angle of view as required by claim 9 as amended.

Finally, Minakuchi further fails to show or suggest that the surface to be scanned is tilted as required by claim 10 as amended. There is simply nothing in Minakuchi including Fig. 6 as cited by the Final Office Action that teaches this aspect of the invention.

Accordingly, each of claims 1, 9 and 10 as amended is believed neither anticipated by nor rendered obvious in view of the cited reference (i.e., Minakuchi) for at least the reasons discussed above.

Reconsideration and withdrawal of the rejections of claims 1, 9 and 10 under 35 U.S.C. §102(b) is respectfully requested.

Applicant has chosen in the interest of expediting prosecution of this patent application to distinguish the cited documents from the pending claims as set forth above. However, these statements should not be regarded in any way as admissions that the cited documents are, in fact, prior art.

New Claims

Claims 68-82 have been added to recite the claimed invention in an alternative manner, of which claims 68, 72, 73 and 81 are independent. Support of the new claims may be found throughout the original specification. For example, claims 68-72 may be supported by the seventh embodiment (i.e., page 70, line 21 to page 76, line 1) and the eighth embodiment (i.e.,

page 77, line 3 to page 81, line 17) along with Figs. 37, 41, 43, 45 and 47 and Tables 3, 5, 7, 9 and 11. Claims 73-82 may be supported by the second embodiment (i.e., page 38, line 6 through page 44, line 18), the third embodiment (i.e., page 48, lines 8-16), and the fourth embodiment (i.e., page 53, line 7 through page 55, line 1), the fifth embodiment (i.e., page 55, line 6 to page 59, line 17), and the sixth embodiment (i.e., page 61, line 24 to page 63, line 6) along with Figs. 17, 18, 21, 22, 25, 26, 29 and 30.

Applicant notes that the added new claims correspond to the claims of issued counterpart patents (i.e., JP 4174287 and JP 4174288) corresponding to the priority Japanese applications (i.e., JP 2002-301869 and JP 2002-302385). For example, new claims 68-72 correspond to the claims of JP 4174287, and new claims 73-82 correspond to the claims of JP 4174288.

Applicant believes that the newly added claims are patentable over the cited reference (i.e., Minakuchi) for at least the reasons as set forth below. For example, Applicant notes that new claim 68 recites, *inter alia*, that “the second meniscus lens is tilted, about an axis perpendicular to a plane including the one-dimensional direction serving as a rotation axis, toward a side in which a light beam emitted from the light source is incident on the reflecting surface with respect to the first meniscus lens, and the second meniscus lens is shifted, in a plane including the one-dimensional direction, toward an incident side of the reflecting surface of the light beam emitted from the light source.”

In contrast, the cited reference (i.e., Minakuchi) discloses that the whole fθ lens 190 is tilted and shifted for adjustment, but does not disclose that the second meniscus lens is tilted or shifted with respect to the first meniscus lens as required by claim 68. Further, in Minakuchi, the directions of the tilting and the shifting cannot be defined in advance since the whole fθ lens 190 is moved for mere adjustment. Accordingly, Applicant believes that Minakuchi fails to show or

suggest the teachings of claim 68, e.g., the directions of the tilting and the shifting.

Also, new claim 73 has the feature, *inter alia*, that “a lens, or a lens of two lenses which is disposed closer to the surface to be scanned, in the optical scanning system is tilted such that an angle between a normal at a surface vertex of an incident surface of the lens and a central axis of a two-dimensional deflecting range of the light beam soon after the light beam is reflected on the deflector is larger than a maximum field angle of the two-dimensional deflecting range and an angle between a normal at a surface vertex of an emergence surface and the central axis is larger than the angle between the normal of the incident surface and the central axis.” As Applicant understand it, there is nothing in Minakuchi that teaches this aspects of the present invention, e.g., the amount of tilting.

Applicant believes that the application as amended including the new claims is in condition for allowance and such action is respectfully requested.

AUTHORIZATION

No petitions or additional fees are believed due for this amendment and/or any accompanying submissions. However, to the extent that any additional fees and/or petition is required, including a petition for extension of time, Applicant hereby petitions the Commissioner to grant such petition, and hereby authorizes the Commissioner to charge any additional fees, including any fees which may be required for such petition, or credit any overpayment to Deposit Account No. 13-4500 (Order No. 1232-5177). A DUPLICATE COPY OF THIS SHEET IS ENCLOSED.

An early and favorable examination on the merits is respectfully requested.

Respectfully submitted,
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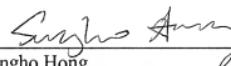
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